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## VA Traumatic Brain Injury Veterans Health Registry Report

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## EXECUTIVE SUMMARY

At the direction of Congress, the Department of Veterans Affairs (VA) maintains the VA Traumatic Brain Injury (TBI) Veterans Health Registry that includes information about Veterans who served in Operation Enduring Freedom (OEF), Operation Iraqi Freedom (OIF), or Operation New Dawn (OND), who exhibit symptoms associated with TBI and seek care or benefits from the VA. From September 2001 through September 2021, a total of 441,639 Veterans have entered the VA TBI Veterans Health Registry. This represents 13.2% of all Veterans who served in OEF/OIF/OND and 29.3% of all OEF/OIF/OND Veterans who have received services from the Veterans Health Administration (VHA).

Veterans in the VA TBI Veterans Health Registry (abbreviated TBI Registry) are identified by any one or combination of three methods: 1) the VA TBI Screen, 2) diagnostic codes in the VHA Patient Care Encounter (PCE) data, and 3) the Veterans Benefit Administration (VBA) Disability Claim file (see the Euler diagram after Table 2). The majority of TBI Registry cases, 369,909 (83.8%), have been identified through the VA TBI Screen which is administered when OEF/OIF/OND Veterans seek VA health care: 262,980 answered four screening questions affirmatively, indicating they were exposed to a traumatic event and experienced a loss or alteration of consciousness as well as symptoms associated with TBI which remained present at the time of the screen; an additional 106,929 reported during the screen that they had already been diagnosed as having a TBI during OEF/OIF/OND deployment. PCE records with TBI diagnoses identified 253,177 (57.3%) of the Veterans in the TBI Registry. This group was hospitalized 66,503 times and was seen 1,521,898 times as outpatients where a TBI diagnosis appeared in the PCE record. The VBA Disability Claim file identified 108,541 (24.6%) of Veterans in the TBI Registry. Of these cases filing TBI related claims, 67.3% were adjudicated to be service connected. About half of Registry cases are identified by multiple methods.

A total of 1,474,152 OEF/OIF/OND Veterans have taken the VA TBI Screen and 25.1% have qualified for the TBI Registry. Compared to those taking the screen who did not qualify for the TBI Registry, those included in the Registry were more likely to be male, age 26 - 30, in the Army or Marines, active duty, and enlisted.

Those with four positive responses to the VA TBI Screen are offered a comprehensive clinical evaluation to diagnose their symptoms and to develop a plan of care. To date, 200,627 Veterans have a complete VA TBI Screen and Clinical Evaluation File (CEF). Of those, the CEF has confirmed TBI in 69.9% of the cases. Of those with a CEF confirming TBI, 66.3% report blast injuries, 42.5% report loss of consciousness, and 31.9% report post-traumatic amnesia. Based on these indicators, 86.6% are classified as having mild TBI, 8.3% moderate TBI, and 4.1% severe TBI.

## **Background of the TBI Veterans Health Registry**

Considered for inclusion in the registry are Veterans who

- Served as a member of the Armed Forces in Operation Enduring Freedom(OEF), Operation Iraqi Freedom (OIF), or Operation New Dawn (OND) after September 11, 2001; and
- Exhibit symptoms associated with TBI, as determined by the Secretary of the VA; and
- Apply for care and services furnished by the VA under chapter 17 of title 38, United States Code; or
- File a claim for compensation under chapter 11 of such title on the basis of any disability which may be associated with TBI as a result of such service.

Veterans fitting this definition are identified and included in the VA TBI Veterans Health Registry if they have at least one of the following:

- a complete VA TBI Screen, in which the Veteran reports a history of TBI diagnosis during OEF/OIF/OND deployment or responds positively to all four VA TBI Screen questions;
- a VBA Disability Claim that includes a claim code for TBI; and/or
- a VHA Patient Care Encounter (PCE) record that includes an ICD-9-CM or ICD-10-CM diagnosis code of TBI (as defined by VA TBI Case finding procedures).

**Table 1: Case Composition of the VA TBI Health Registry**

	<b>TBI Registry Cases<sup>1,2</sup></b>
Total Unique Registry Cases (May meet Multiple Inclusion Criteria)	441,639
Registry Cases Identified by the VA TBI Screen <sup>3</sup>	369,909 (83.8%)
VBA Disability Claim File with a TBI Claim Code <sup>4</sup>	108,541 (24.6%)
VHA Patient Care Encounter (PCE) with an ICD-9/10-CM VA/DOD Case Finding Code of TBI <sup>5</sup>	253,177 (57.3%)

<sup>1</sup> See Appendix 1 for date ranges of the data files used in Report Preparation

<sup>2</sup> Percentages represent percent of unique TBI Registry cases

<sup>3</sup> Includes Veterans with TBI with a complete VA TBI Screen, in which the Veteran reports that they have already been diagnosed as having a TBI during OEF/OIF/OND deployment or in which the person responds positively to all four VA TBI Screen questions

<sup>4</sup> Includes individuals with a VBA Disability Claim that includes a claim code for TBI (8045)

<sup>5</sup> A VHA PCE record that includes at least one ICD-9-CM or ICD-10-CM code of TBI

**Table 2: OEF, OIF, and OND Veterans Completing VA TBI Screen and Screen Results**

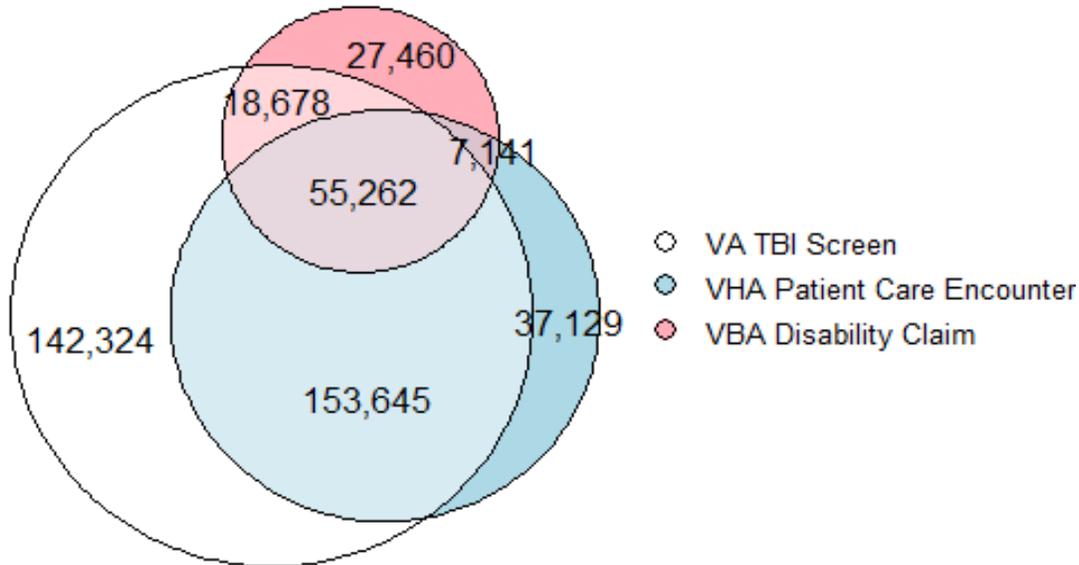
	<b>Number of Individuals with a VA TBI Screen<sup>1</sup></b>
Total Veterans with a Complete VA TBI Screen	1,474,152
Registry Cases Identified by VA TBI Screen <sup>2</sup>	369,909 (25.1%)
Report of A Prior Diagnosis of TBI during OEF/OIF/OND Deployment on VA TBI Screen <sup>3</sup>	106,929 (7.3%)
Four Positive Responses to VA TBI Screen <sup>3</sup>	262,980 (17.8%)

<sup>1</sup> Percentages represent percent of Total Veterans with a complete VA TBI Screen

<sup>2</sup> Includes Veterans with a report of previous TBI during OEF/OIF/OND or four positive responses to VA TBI Screen

<sup>3</sup> Veterans with multiple VA TBI Screens are categorized by their first identification of TBI

## Case Composition of the VA TBI Registry by Method(s) of Entry



**LEGEND:** N = 441,639

- A) Cases identified only by the VA TBI Screen  
(n = 142,324; 32.23%)
- B) Cases identified only by a TBI ICD code within VHA Patient Care Encounter (PCE)  
(n = 37,129; 8.41%)
- C) Cases identified only by inclusion of a TBI code in a VBA Disability Claim  
(n = 27,460; 6.22%)
- D) Cases identified by the VA TBI Screen and a TBI ICD code in a VHA PCE  
(n = 153,645; 34.79%)
- E) Cases identified by the VA TBI Screen and a TBI code in a VBA Disability Claim  
(n = 18,678; 4.23%)
- F) Cases identified by a TBI ICD code within a VHA PCE and inclusion of a TBI code in a VBA Disability Claim  
(n = 7,141; 1.62%)
- G) Cases identified by the VA TBI Screen, a TBI ICD code within a VHA PCE, and inclusion of a TBI code in a VBA Disability Claim  
(n = 55,262; 12.51%)

**Table 3. Demographic & Military Characteristics of OEF, OIF, and OND Veterans Completing the VA TBI Screen**

	<b>Overall</b>
	(N=1,474,152)
<b>Sex</b>	
Female	194,118 (13.2%)
Male	1,280,028 (86.8%)
Unknown	6 (0%)
<b>Age</b>	
≤25	584,055 (39.6%)
26-30	313,103 (21.2%)
31-40	341,063 (23.1%)
>40	235,910 (16%)
Unknown	21 (0%)
<b>Race/Ethnicity</b>	
Asian/Pacific Islander	98,423 (6.7%)
Black	254,512 (17.3%)
Hispanic	158,446 (10.7%)
Native American/Alaskan	21,357 (1.4%)
White	904,777 (61.4%)
Other/Unknown	36,637 (2.5%)
<b>Component</b>	
Guard	284,758 (19.3%)
Regular Active	909,663 (61.7%)
Reserve Retiree	1,056 (0.1%)
Reserves	278,675 (18.9%)
<b>Service Branch</b>	
Air Force	207,829 (14.1%)
Army	821,935 (55.8%)
Coast Guard	1,955 (0.1%)
Marines	217,372 (14.7%)
Navy	225,061 (15.3%)
<b>Rank</b>	
Cadet	15 (0%)
Enlisted	1,335,573 (90.6%)
Officer	116,999 (7.9%)
Warrant	21,533 (1.5%)
Other/Unknown	32 (0%)

Demographic characteristics are captured at time of first TBI qualifying the Veteran for the TBI Registry

**Table 4. Demographic & Military Characteristic of OEF, OIF, and OND Veterans Completing the VA TBI Screen by Result**

	I. Veterans Not included in the Registry by VA TBI Screen (N=1,104,243) <sup>2</sup>	II. VA TBI Registry Cases Identified by VA TBI Screen <sup>1</sup> (N=369,909) <sup>2</sup>	III. VA TBI Registry Cases - Self Report Previous TBI Diagnosis (N=106,929) <sup>3</sup>	IV. VA TBI Registry Cases - Four Positive Responses to VA TBI Screen (N=262,980) <sup>3</sup>
<b>Total Cases</b>				
<b>Sex</b>				
Female	167,737 (86.4%)	26,381 (13.6%)	7,828 (29.7%)	18,553 (70.3%)
Male	936,500 (73.2%)	343,528 (26.8%)	99,101 (28.8%)	244,427 (71.2%)
Unknown	6 (100%)	0 (0%)	0 (0%)	0 (0%)
<b>Age</b>				
≤25	429,350 (73.5%)	154,705 (26.5%)	39,189 (25.3%)	115,516 (74.7%)
26-30	227,843 (72.8%)	85,260 (27.2%)	24,900 (29.2%)	60,360 (70.8%)
31-40	255,851 (75%)	85,212 (25%)	28,467 (33.4%)	56,745 (66.6%)
>40	191,184 (81%)	44,726 (19%)	14,373 (32.1%)	30,353 (67.9%)
Unknown	15 (71.4%)	6 (28.6%)	0 (0%)	6 (100%)
<b>Race/Ethnicity</b>				
Asian/Pacific Islander	66,790 (67.9%)	31,633 (32.1%)	9,704 (30.7%)	21,929 (69.3%)
Black	197,008 (77.4%)	57,504 (22.6%)	15,116 (26.3%)	42,388 (73.7%)
Hispanic	119,672 (75.5%)	38,774 (24.5%)	10,273 (26.5%)	28,501 (73.5%)
Native American/Alaskan	15,618 (73.1%)	5,739 (26.9%)	1,657 (28.9%)	4,082 (71.1%)
White	676,583 (74.8%)	228,194 (25.2%)	68,067 (29.8%)	160,127 (70.2%)
Other/Unknown	28,572 (78%)	8,065 (22%)	2,112 (26.2%)	5,953 (73.8%)
<b>Component</b>				
Guard	222,163 (78%)	62,595 (22%)	13,892 (22.2%)	48,703 (77.8%)
Regular Active	662,742 (72.9%)	246,921 (27.1%)	80,950 (32.8%)	165,971 (67.2%)
Reserve Retiree	913 (86.5%)	143 (13.5%)	31 (21.7%)	112 (78.3%)
Reserves	218,425 (78.4%)	60,250 (21.6%)	12,056 (20%)	48,194 (80%)
<b>Service Branch</b>				
Air Force	187,718 (90.3%)	20,111 (9.7%)	5,486 (27.3%)	14,625 (72.7%)
Army	564,671 (68.7%)	257,264 (31.3%)	76,733 (29.8%)	180,531 (70.2%)
Coast Guard	1,750 (89.5%)	205 (10.5%)	56 (27.3%)	149 (72.7%)
Marines	153,280 (70.5%)	64,092 (29.5%)	17,637 (27.5%)	46,455 (72.5%)
Navy	196,824 (87.5%)	28,237 (12.5%)	7,017 (24.9%)	21,220 (75.1%)
<b>Rank</b>				
Cadet	11 (73.3%)	4 (26.7%)	1 (25%)	3 (75%)
Enlisted	987,925 (74%)	347,648 (26%)	98,187 (28.2%)	249,461 (71.8%)
Officer	99,132 (84.7%)	17,867 (15.3%)	6,990 (39.1%)	10,877 (60.9%)
Warrant	17,152 (79.7%)	4,381 (20.3%)	1,748 (39.9%)	2,633 (60.1%)
Other/Unknown	23 (71.9%)	9 (28.1%)	3 (33.3%)	6 (66.7%)

Demographic characteristics are captured at time of first TBI qualifying Veteran for the TBI Registry

<sup>1</sup> For Veterans with multiple VA TBI Screens, the first screen resulting in inclusion as a TBI Registry case is used

<sup>2</sup> Column is a subset of Table 3, percentages represent row percentage of column I and II

<sup>3</sup> Column is a subset of column II, percentages represent row percent of column III and IV

**Table 5. Summary of Subsequent Clinical Evaluation Results for VA TBI Screen Positive Cases**

	<b>TBI Registry cases Identified by the VA TBI Screen With a Follow-Up TBI Clinical Evaluation Form (CEF)</b>
Total Veterans with a Complete VA TBI Screen & CEF	200,627
Clinical Confirmation of OEF/OIF/OND Deployment Related TBI <sup>1</sup>	140,295 (69.9%)

<sup>1</sup> Additional TBI-related clinical evaluation is offered to all Veterans who screen positive; however, not all people who screen positive undertake the evaluation

**Table 6. Detailed Summary of Clinical Evaluation Results for Veterans Identified as having a TBI by the VA TBI Screen and a confirmed TBI diagnosis by the VA Clinical Evaluation (N=140,295)**

<sup>1</sup>	None	One	Two or More	Missing
<b>Specific Injury Etiologies Reported</b>				
Bullet Injuries	137,189 (97.8%)	2,047 (1.5%)	1,030 (0.7%)	29 (0%)
Fall Injuries	102,571 (73.1%)	26,843 (19.1%)	10,631 (7.6%)	250 (0.2%)
Blast Injuries	41,376 (29.5%)	46,418 (33.1%)	46,645 (33.2%)	5,856 (4.2%)
Vehicular Injuries	109,394 (78%)	22,068 (15.7%)	8,583 (6.1%)	250 (0.2%)
<b>Number of Injury Etiologies Reported</b>				
Etiologies Reported	15,936 (11.4%)	51,197 (36.5%)	73,162 (52.1%)	0 (0%)
<b>Disrupted Brain Function Reported</b>				
Loss of Consciousness	59,616 (42.5%)	47,074 (33.6%)	12,498 (8.9%)	21,107 (15%)
Alteration of Consciousness	10,757 (7.7%)	70,954 (50.6%)	40,307 (28.7%)	18,277 (13%)
Post-traumatic Amnesia	83,984 (59.9%)	34,413 (24.5%)	10,289 (7.3%)	11,609 (8.3%)
<b>Severity of TBI</b>				
	<b>Mild</b>	<b>Moderate</b>	<b>Severe</b>	<b>Missing</b>
Most Severe Brain Injury Reported <sup>2</sup>	121,523 (86.6%)	11,674 (8.3%)	5,735 (4.1%)	1,363 (1%)

<sup>1</sup> Percentages are presented as row percents

<sup>2</sup> Traumatic brain injury severity ratings are based on duration of loss of consciousness, alteration of consciousness, and/or post-traumatic amnesia at the time of injury. The Clinical Evaluation relies on patient self-report obtained months to years from the date of injury which may impact the accuracy of severity determination

A total of 108,541 cases were identified and included in the VA TBI Veterans Health Registry using the Veterans Benefit Administrative (VBA) Disability Claim file records with codes for TBI. This Table 7 indicates the maximum TBI disability adjudication for the 73,097 (67.3%) that were adjudicated as service connected.

**Table 7. Frequency Distribution of VBA TBI Service Connected Disability by Percentage**

	<b>Overall</b>
	(N=73,097)
<b>Highest TBI Disability Adjudication<sup>1,2</sup></b>	
Service Connected Non-compensable (0%)	14,770 (20.2%)
Mild Disability (10%-20%)	31,511 (43.1%)
Definite Disability (30%-40%)	17,611 (24.1%)
Considerable Disability (50%-60%)	156 (0.2%)
Severe Disability (70%-90%)	7,472 (10.2%)
Total Disability (100%)	1,577 (2.2%)

<sup>1</sup>If multiple adjudications occur, the adjudication with the highest percentage of TBI disability is reported

<sup>2</sup>Adjudication percentages fall between 0 and 100 and are only assigned in multiples of 10%

**Table 8. VA TBI Health Registry Cases Identified by Electronic Medical Record Review by Veterans Integrated Service Network (VISN)**

Total Veterans/Visits per VISN	Number of Veterans <sup>1</sup>		Number of Visits <sup>1</sup>	
	Any Diagnosis of TBI Inpatient Visits <sup>2</sup>	Any Diagnosis of TBI Outpatient Only Visits <sup>2</sup>	Any Diagnosis of TBI Inpatient Visits <sup>2</sup>	Any Diagnosis of TBI Outpatient Only Visits <sup>2</sup>
	(N=21,822)	(N=231,355)	(N=66,503)	(N=1,521,898)
VA New England Healthcare System	1,354 (6.2%)	8,603 (3.72%)	5,111 (7.69%)	72,137 (4.74%)
New York/New Jersey VA Health Care Network	836 (3.83%)	8,689 (3.76%)	2,802 (4.21%)	54,858 (3.6%)
VA Healthcare - VISN 4	999 (4.58%)	9,186 (3.97%)	3,556 (5.35%)	77,580 (5.1%)
VA Capitol Health Care Network	422 (1.93%)	6,246 (2.7%)	1,364 (2.05%)	39,428 (2.59%)
VA Mid-Atlantic Health Care Network	1,633 (7.48%)	15,555 (6.72%)	4,710 (7.08%)	109,739 (7.21%)
VA Southeast Network	1,204 (5.52%)	16,010 (6.92%)	3,220 (4.84%)	95,246 (6.26%)
VA Sunshine Healthcare Network	2,254 (10.33%)	17,962 (7.76%)	6,769 (10.18%)	161,253 (10.6%)
VA MidSouth Healthcare Network	550 (2.52%)	6,422 (2.78%)	1,804 (2.71%)	40,938 (2.69%)
VA Healthcare System	1,373 (6.29%)	13,083 (5.65%)	4,337 (6.52%)	94,650 (6.22%)
VA Great Lakes Health Care System	1,081 (4.95%)	9,285 (4.01%)	3,222 (4.84%)	58,639 (3.85%)
VA Heartland Network	929 (4.26%)	7,616 (3.29%)	2,841 (4.27%)	58,988 (3.88%)
South Central VA Health Care Network	1,276 (5.85%)	13,743 (5.94%)	3,842 (5.78%)	70,856 (4.66%)
VA Heart of Texas Health Care Network	1,172 (5.37%)	22,284 (9.63%)	3,377 (5.08%)	93,171 (6.12%)
Rocky Mountain Network	1,366 (6.26%)	14,225 (6.15%)	4,153 (6.24%)	80,229 (5.27%)
Northwest Network	808 (3.7%)	11,512 (4.98%)	2,134 (3.21%)	55,111 (3.62%)
Sierra Pacific Network	1,248 (5.72%)	12,841 (5.55%)	3,654 (5.49%)	92,857 (6.1%)
Desert Pacific Healthcare Network	1,904 (8.73%)	24,203 (10.46%)	5,469 (8.22%)	173,175 (11.38%)
VA Midwest Health Care Network	844 (3.87%)	9,397 (4.06%)	2,579 (3.88%)	62,674 (4.12%)
Not matched	569 (2.61%)	4,493 (1.94%)	1,559 (2.34%)	30,369 (2%)

<sup>1</sup> Percentages presented represent column percents

<sup>2</sup> The diagnosis of TBI was determined by review of all ICD-9-CM and ICD-10-CM codes included within the record for each visit, as non-TBI diagnosis codes were frequently listed as the primary or principal diagnosis

## Appendix I. Summary of Source Data File Date

<b>Data File</b>	<b>Start Date</b>	<b>End Date</b>
Roster	2001-09-12	2020-11-30
VA TBI Screen	2007-10-01	2021-09-30
Clinical Evaluation	2007-10-09	2021-09-30
VHA Patient Care Encounter	2001-09-12	2021-09-30
VBA Disability Claim	2001-10-01	2021-09-30

## Appendix II. Flowchart of Veterans Entering the VA TBI Veterans Health Registry

